

## RIVERS AND FLOODS, SEPTEMBER, 1911.

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There were no floods of consequence during the month in the larger rivers, although a moderate one occurred about the middle of the month in the upper Ohio River and its tributaries. This flood was caused by heavy rains on September 14 and 15 over the upper Ohio watershed. Warnings were issued on September 15 for a stage of 22 feet at Pittsburgh, Pa., on the following day, and on September 16 for a 30-foot stage at Parkersburg, W. Va., within two days. Flood stages were exceeded in the Kiskiminetas River and in the lower portions of the Allegheny and the Monongahela Rivers, while at Pittsburgh the crest stage was 19.7 feet at 10 a. m., September 16. The smaller streams overflowed their banks, and these caused practically all the damage, which was about as follows:

Property, excluding crops.....	\$200,000
Crops.....	25,000
Damage to farm lands.....	25,000
Suspension of business.....	25,000
Total.....	275,000

Value of property saved through Weather Bureau warnings, about \$75,000. The warnings enabled more than 500 campers on the islands in the Allegheny River to move away, and constructors of dams and bridges along the Ohio River escaped loss, except that occasioned by the flooding of cofferdams.

At Parkersburg the crest stage was 29.9 feet at 10 a. m., September 18, only 0.1 foot below the stage forecast two days previously.

Excessive rains fell over northern Montana from September 4 to 6, inclusive, and the Milk River rose to 10.1 feet on September 7, 1.1 feet above flood stage. No damage appears to have been done, and the heavy rains, while they retarded harvesting operations somewhat, were of great benefit to the farmers. Eastern Kansas, Missouri, southern Iowa, and central Illinois were also visited by exceptionally heavy rains during the afternoon and night of September 6 and the morning of September

7, and all the smaller streams overflowed their banks, flooding crops in bottom lands, carrying away bridges, causing railroad washouts and much other damage of the usual character.

There were heavy rains on September 4 and 5 over the upper watershed of the Santee River of South Carolina, and on the morning of September 6 flood warnings were issued. The rivers did not quite reach the flood stage, but the warnings were nevertheless of great importance to cattle and other interests. The rivers had been low for some time, and warnings of any decided rise were necessary in order to protect property in the swamps and lowlands.

Frequent heavy rains brought many of the rivers of Indiana and Illinois to the flood stage on September 18 and 19, and much damage was done to corn on bottom lands, etc., except along the Illinois River, where there was not much loss. Warnings were issued for the lower Illinois River on September 19, and again on September 25, and at the end of the month the river was still rising from Peoria southward.

The Mississippi River exhibited a rising tendency below Lake Pepin after the first decade of the month on account of the heavy rains in Iowa, Missouri, and Illinois. The rise was most marked below the mouth of the Des Moines River, and below Cairo, Ill., it was supplemented by the tide from the Ohio River that reached Cairo on September 27. At the end of the month the rise was just beginning at the mouth of the Mississippi River.

The eastern, extreme western, and southern rivers were low throughout the month except in the Carolinas, where there were sharp rises during the first days of the month.

Hydrographs for typical points on several principal rivers are shown on Chart I. The stations selected for charting are Keokuk, St. Louis, Memphis, Vicksburg, and New Orleans, on the Mississippi; Cincinnati and Cairo, on the Ohio; Nashville, on the Cumberland; Johnsonville, on the Tennessee; Kansas City, on the Missouri; Little Rock, on the Arkansas; and Shreveport, on the Red.